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MONTHLY REPORT

ON THE NUCLEAR FUEL MARKET

NUEXCO

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MONTHLY REPORT ON THE NUCLEAR FUEL MARKET

November 1985 No. 207

GEORGE WHITE, JR., *EDITOR* CLARK M. BEYER, *ASSOCIATE EDITOR*

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NATURAL URANIUM AND SECONDARY MARKET CONVERSION

(All data as of October 31, 1985)

The **Exchange Value** is **$16.50** per pound U_3O_8, up $0.50 since last month. **Active supply** of natural uranium (U_3O_8 and UF_6) for spot or near-term delivery totals **3,210,000** pounds equivalent U_3O_8 as concentrates or UF_6, up 1,115,000 pounds since last month. The corresponding figure for **active demand** is **895,000** pounds, down 205,000 pounds. The spot and near-term **supply-demand ratio** rose to **3.6:1.**

The *Current Market Data* section of this Report lists five natural uranium sales transactions, involving a total of approximately 1,400,000 pounds U_3O_8. All of the transactions reported this month involved deliveries in the near term, and three met the criteria for inclusion in the current Transaction Value calculation.

The **Transaction Value** is **$15.75** per pound U_3O_8, up $0.65 since last month. Because June transactions, most of which were concluded at prices below $15.00, were removed from the calculation, there was a considerable rise in the Transaction Value.

The **UF_6 Value** is **$46.00** per kilogram U in UF_6, up $1.50 since last month.

The **Conversion Value** is **$1.60** per pound U in UF_6, unchanged since last month. No active supply or demand of secondary market conversion services for delivery within three years is reported. In addition, no secondary market conversion transactions are reported, reflecting the reduced availability of conversion services on the secondary market. Moreover, discretionary buyers are not compelled to purchase unless opportunities arise that can offer substantial discounts from primary market conversion prices.

The **Loan Use Charge Rate** is unchanged at **5 percent** per annum, as both lenders and borrowers continue to express their interest in doing business at that level.

* * *

The Exchange Value and UF_6 Value rose slightly this month in the wake of higher transaction prices and overall market firming. Much of the current demand consists of longer-term opportunities, and fewer opportunities for immediate delivery are occurring as the end of the year approaches. Buyers generally appeared more willing to consider price levels that were viewed as too high last month. Nevertheless, a wide range of transaction prices is in effect; smaller quantities on the order of 100,000 pounds are available at slightly below $16.50, but larger quantities closer to one million pounds cannot be obtained at that level.

The UF_6 Value remains slightly less than the algebraic sum of the Exchange and Conversion Values. The presence of a few sellers that are willing to discount UF_6 in order to sell it on short notice continues to restrain UF_6 prices from reaching parity.

The weakening of the US dollar against other currencies continued, causing the effective price of dollar-denominated uranium to rise in those currencies. The US dollar's decline again served to discourage sellers of spot or near-term material, while helping buyers intent on purchasing at dollar prices.

While a general sense persists that spot prices will continue to move higher in the near term, buyers' resistance is such that the price rise for near-term delivery has been moderate, largely reflecting the discretionary nature of near-term demand. For their part, most sellers, in light of DOE's non-viability findings and the federal court decision invalidating the USEC, are now confident of higher prices and appear content to wait.

Most market participants readily agree (and some recently announced contracts appear to confirm) that prices expressed in constant dollars for longer-term delivery are considerably above current spot market levels. However, there is a wide divergence of opinion regarding the timing and inevitability of a price convergence. Those arguing that spot prices must move sharply higher in the near term assert the following:

1. Most of the distress inventory has been sold, removing this source of downward price pressure.

2. The Secretary of Energy's finding that the US uranium industry is not viable indicates that a reimposition of some form of limitation on imports of non-US origin material is likely. Such a limitation would lead to higher prices as US utilities become forced to buy uranium from higher-cost US producers.

3. Notwithstanding any new import limitation, utility assumptions about the availability of uncommitted, low-cost, non-US supply are overly optimistic, and it will soon become apparent that buyers, particularly in the USA, will be seeking more uranium than is available from non-US sellers.

Opposing points of view take issue with such reasoning by arguing that:

1. Past predictions of the end of inventory selling have been premature. Total inventory continues to grow, and more can be made available to the market through borrowing and selling or related schemes.

2. Notwithstanding the non-viability finding, reimposition of an import limitation is unlikely for both economic and political reasons. Industry viability was a concern 30 years ago when resource availability was less certain. There is no longer such concern.

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3. Arguments about the national security issue are specious. A uranium embargo would be particularly offensive to Canada, the USA's largest trading partner, and in view of the Reagan administration's refusal to protect artificially the steel, automobile, copper, shoe, and other industries, difficulties in the uranium industry are unlikely to trigger protectionist legislation. The removal of Canada's upgrading requirement or Australia's floor price could also undercut demands to protect the US industry.

Current near-term buying is based more on economic considerations than on security of supply. The availability of low-cost resources is well-known, so a procurement panic is unlikely to develop.

The argument that prices will increase at a moderate rate rests on the long-term economic reality of large uranium discoveries having high ore grades and low production costs. This argument discounts the implication that in the long term it is possible to impose prices through legal, procedural, or other non-economic means. Thus, while the USEC invalidation ruling and non-viability finding have caused a good deal of speculation, these two events have not precipitated any dramatic market reaction to date.

* * *

As anticipated, the Justice Department, on behalf of DOE and the three US producer plaintiffs, filed a new round of cross-motions for summary judgment in the Denver lawsuit. In addition, the Uranium Producers of America filed an *amicus curiae* brief on behalf of the plaintiffs. The plaintiffs' principal thrust is aimed at Count I of the complaint, and argues that since the industry has been found non-viable, DOE must *immediately* cease all enrichment of non-US origin uranium destined for use in US reactors, pending development of new criteria governing the use of non-US material.

If the court were to rule in favor of the plaintiffs on this issue, the results could be dramatic. Even if stayed or appealed, such a ruling would create great uncertainty and would likely initiate a period of intense market activity. Any natural inclination to assume a sudden and sharp rise in spot-market prices for US-origin uranium must be balanced against other market factors. Substantial quantities of US-origin material are held by non-US entities and would be available for nationality swaps. US inventories are at record-high levels. A more sophisticated utility market sector is unlikely to precipitate the panic-buying behavior that characterized the aftermath of Westinghouse's 1975 default.

ENRICHED URANIUM AND SWUS

The Nuexco **SWU Values** as of October 31, 1985 are:

1. For **DOE origin,** a tails assay of 0.30 weight-percent U_{235}, for delivery by the end of FY86, and certifiable as excess, **$83** per SWU, down $2.

For **other** SWUs (includes DOE origin SWUs not certifiable as excess and non-DOE origin SWUs), for delivery by the end of calendar year 1986, **$83** per SWU, up $5.

No secondary market SWU transactions are reported this month, as the markets for DOE-certifiable SWU and non-DOE or non-certifiable SWU ostensibly converged into one market. The identical SWU values this month indicate the demise of the two-tiered SWU market which arose one year ago. Two main factors are responsible:

1. Virtually all potential buyers restricted by DOE to purchasing certifiable SWU have covered their requirements. One opportunity for a moderate quantity remains in the market. Sellers holding certifiable SWU are actively pursuing this last opportunity, applying downward pressure on the DOE-certifiable SWU Value until a transaction occurs. Henceforth, sellers of certifiable SWU will be forced to sell to buyers that are not restricted to the DOE market. Already, at least one large seller has decided to market its SWU in competition with the non-DOE SWU sellers, effectively ending the two-tiered market.

2. Simultaneously, the continuing decline of the US dollar relative to other currencies served to raise the prices offered (quoted in US dollars) by the traditional European sellers of non-DOE SWU. These sellers, intent on obtaining certain prices in their own currencies, have not been willing to rely on the fluctuations of the dollar. The continuing uncertainty over the validity of the Utility Services contract has reinforced the upward pressure on non-DOE SWU prices, and has eliminated some potential sellers of DOE SWU from the market. Finally, the possibility that USEC holders may be able to buy SWU on the spot market could create large quantities of new demand. This potential demand causes additional upward pressure on non-DOE SWU prices.

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CURRENT MARKET DATA

October 31, 1985	Market Values	Active Supply[1] (thousands)	Active Demand[1] (thousands)
EXCHANGE VALUE	**$16.50**/lb. U_3O_8	3,210	895
UF_6 VALUE	**$46.00**/kgU		
CONVERSION VALUE	**$1.60**/lb. U as UF_6	0	0
SWU VALUES			
DOE origin, certifiable as excess, 0.3 tails assay delivery by the end of FY86	**$83**/SWU		
Other SWUs (non-DOE or non-certifiable) delivery by the end of calendar year 1986	**$83**/SWU		
LOAN USE CHARGE RATE	5%/annum	2,000	0

TRANSACTION VALUE	$/lb. U_3O_8	Millions of Pounds	Number of Transactions	Number of Months
	15.75	2.2	13	4

[1]Supply and demand tables in the *Current Market Data* section of this Report detail the numbers for each category.

DEFINITIONS

1. The **Exchange Value** is Nuexco's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the date indicated.
2. The **UF_6 Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of natural uranium hexafluoride could be concluded as of the date indicated.
3. The **Conversion Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the date indicated.
4. The **SWU Values** represent Nuexco's judgment of the price at which transactions for the sale of significant quantities of SWUs of stated origin for delivery in the specified time period could be concluded as of the date indicated.
5. The **Loan Use Charge Rate** is Nuexco's judgment of the annual interest rate at which uranium loans could be concluded as of the date indicated.
6. The **Transaction Value** is a weighted average price of recent natural uranium sales transactions. The calculation is based on prices paid in:
   a. Transactions closed within the previous three-month period for which delivery is scheduled within one year of the transaction date;
   b. At least ten transactions;
   c. Transactions involving a sum total of at least 2 million pounds U_3O_8 equivalent.

   The sample time is extended as necessary to include these minima. Other currencies are converted to US dollars using conversion rates in effect on or near the transaction date.

DERIVATIONS AND COMMENTS

1. All Market Values are based on:
   a. Data from recently completed transactions.
   b. Data from pending transactions.
   c. Firm bids to buy or borrow, and firm offers to sell or lend.
   d. Prices purchasers or rates borrowers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy or borrow, and prices sellers or rates lenders have expressed a willingness to offer, but for which Nuexco is not aware of firm offers to sell or lend.
2. Prices associated with deliveries under old or renegotiated contracts or other than arm's-length transactions are not considered in the determination of these Market Values.
3. In the determination of the Conversion Value, Nuexco does not consider transportation charges other than those customarily provided by primary suppliers of conversion services.
4. The prices of conversion services or SWUs delivered under long-term contracts with primary suppliers are not considered in the determination of either the Conversion Value or SWU Value.
5. For the DOE SWU Values, Nuexco converts SWU prices at varying tails and product assays to equivalent SWU prices at a tails assay of 0.30 weight-percent U^{235} and a product assay of 3.0 weight-percent U^{235}, assuming feed costs corresponding to the Nuexco Exchange and Conversion Values determined as of the same date.
6. In calculating the Transaction Value, Nuexco does not account for the price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of future Exchange Values or any other indeterminant variable. Also excluded from the calculation are any other transactions in which the delivery price is defined in such a way that it cannot currently be determined.

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CURRENT MARKET DATA

EXCHANGE VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates			per kg. U in Concentrates		
	This Month (Oct. 31, 1985)	Last Month (Sep. 30, 1985)	12 Months Ago (Oct. 31, 1984)	This Month (Oct. 31, 1985)	Last Month (Sep. 30, 1985)	12 Months Ago (Oct. 31, 1984)
Australia (dollar)	23.51	22.79	18.90	61.13	59.25	49.14
Belgium (comm. franc)	873.94	866.27	984.62	2,272	2,252	2,560
Canada (dollar)	22.55	21.98	21.08	58.63	57.15	54.80
Finland (markka)	92.54	91.90	101.59	240.59	238.92	264.10
France (franc)	132.32	130.61	149.39	344.00	339.56	388.39
FRG (mark)	43.43	42.94	48.69	112.91	111.64	126.59
Italy (lira)	29,188	29,154	30,177	75,882	75,795	78,454
Japan (yen)	3,507	3,458	3,927	9,119	8,991	10,210
Netherlands (guilder)	48.79	48.28	54.91	126.84	125.52	142.75
South Africa (rand)	42.04	40.30	30.59	109.29	104.78	79.53
Spain (peseta)	2,647	2,611	2,736	6,883	6,789	7,113
Sweden (krona)	129.62	128.51	139.13	336.97	334.11	361.71
Switzerland (franc)	35.56	35.15	40.06	92.45	91.38	104.15
UK (pound)	11.51	11.37	13.18	29.91	29.55	34.26
US (dollar)	16.50	16.00	16.00	42.90	41.60	41.60

TRANSACTION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates			per kg. U in Concentrates		
	This Month (Oct. 31, 1985)	Last Month (Sep. 30, 1985)	12 Months Ago (Oct. 31, 1984)	This Month (Oct. 31, 1985)	Last Month (Sep. 30, 1985)	12 Months Ago (Oct. 31, 1984)
Australia (dollar)	22.45	21.51	18.96	58.35	55.92	49.29
Belgium (comm. franc)	834.22	817.54	987.69	2,168	2,125	2,568
Canada (dollar)	21.53	20.74	21.14	55.97	53.93	54.97
Finland (markka)	88.33	86.73	101.90	229.65	225.48	264.93
France (franc)	126.30	123.27	149.86	328.36	320.46	389.60
FRG (mark)	41.46	40.53	48.84	107.78	105.36	126.98
Italy (lira)	27,861	27,514	30,272	72,433	71,531	78,699
Japan (yen)	3,348	3,264	3,940	8,704	8,486	10,242
Netherlands (guilder)	46.57	45.56	55.08	121.07	118.46	143.19
South Africa (rand)	40.13	38.04	30.69	104.32	98.88	79.78
Spain (peseta)	2,527	2,464	2,745	6,570	6,407	7,135
Sweden (krona)	123.72	121.29	139.57	321.65	315.31	362.84
Switzerland (franc)	33.94	33.17	40.19	88.25	86.24	104.47
UK (pound)	10.98	10.73	13.22	28.55	27.89	34.37
US (dollar)	15.75	15.10	16.05	40.95	39.26	41.73

[1]Calculated using currency exchange rates published in the *Wall Street Journal* on October 31, 1985.

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CURRENT MARKET DATA

CONVERSION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U as UF_6			per kg. U as UF_6		
	This Month (Oct. 31, 1985)	Last Month (Sep. 30, 1985)	12 Months Ago (Oct. 31, 1984)	This Month (Oct. 31, 1985)	Last Month (Sep. 30, 1985)	12 Months Ago (Oct. 31, 1984)
Australia (dollar)	2.28	2.28	1.18	5.03	5.02	2.60
Belgium (comm. franc)	84.75	86.63	61.54	186.83	190.98	135.67
Canada (dollar)	2.19	2.20	1.32	4.82	4.85	2.90
Finland (markka)	8.97	9.19	6.35	19.78	20.26	14.00
France (franc)	12.83	13.06	9.34	28.29	28.80	20.58
FRG (mark)	4.21	4.29	3.04	9.29	9.47	6.71
Italy (lira)	2,830	2,915	1,886	6,239	6,427	4,158
Japan (yen)	340.14	345.87	245.46	749.87	762.51	541.14
Netherlands (guilder)	4.73	4.83	3.43	10.43	10.64	7.57
South Africa (rand)	4.08	4.03	1.91	8.99	8.89	4.22
Spain (peseta)	256.74	261.14	171.00	566.01	575.71	376.99
Sweden (krona)	12.57	12.85	8.70	27.71	28.33	19.17
Switzerland (franc)	3.45	3.51	2.50	7.60	7.75	5.52
UK (pound)	1.12	1.14	0.82	2.46	2.51	1.82
US (dollar)	1.60	1.60	1.00	3.53	3.53	2.20

SWU VALUES AND UF_6 VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	DOE SWU Delivery by the End of FY86 (October 31, 1985)	Non-DOE SWU Delivery by the End of CY86 (October 31, 1985)	UF_6 Value per kg. U in UF_6 This Month (October 31, 1985)	UF_6 Value per kg. U in UF_6 Last Month (September 30, 1985)
Australia (dollar)	118.28	118.28	65.56	63.39
Belgium (comm. franc)	4,396	4,396	2,436	2,409
Canada (dollar)	113.45	113.45	62.88	61.13
Finland (markka)	465.51	465.51	257.99	255.60
France (franc)	665.50	665.50	368.89	363.27
FRG (mark)	218.48	218.48	121.08	119.43
Italy (lira)	146,824	146,824	81,372	81,086
Japan (yen)	17,644	17,644	9,778	9,619
Netherlands (guilder)	245.42	245.42	136.01	134.28
South Africa (rand)	211.47	211.47	117.20	112.09
Spain (peseta)	13,318	13,318	7,381	7,262
Sweden (krona)	652.00	652.00	361.35	357.43
Switzerland (franc)	178.88	178.88	99.14	97.76
UK (pound)	57.88	57.88	32.08	31.62
US (dollar)	83.00	83.00	46.00	44.50

[1]Calculated using currency exchange rates published in the *Wall Street Journal* on October 31, 1985.

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CURRENT MARKET DATA

RECENT TRANSACTIONS[1]

Uranium Sales

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current Exchange or UF_6 Value	Seller	Buyer	Remarks
3607	1986	301-600	109	Producer	European Utility	Not an arm's-length transaction.
3606	1985	101-300	see remarks	Canadian Producer	European Utility	Market-related price.
3605	1985	50-100	98	R[2]	Trader	
3603	1986	301-600	99	Trader	European Utility	
3579	1985	301-600	99	US Producer	US Producer	

[1] Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.
[2] The notation *R* means that Nuexco either does not know, or that Nuexco has restricted that information to protect client confidentiality.

No secondary market sales of conversion or enrichment services are reported.

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URANIUM SUPPLY
(October 31, 1985)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale:			
ACTIVE			
2483*	70	—	
2654	300	700 per year	UF_6
2711*	70	—	
2728*	350	—	
2737*	120	200 per year	1986-92
2746	180	—	UF_6e
2764*	260	—	UF_6
2765*	260	—	UF_6
2793*	1,000	—	
2814	500	500	UF_6
2825*	100	—	
2263	—	400 per year	1987 on
2625*	—	500 per year	1987 on
2680*	—	500 per year	1986-92
2778	—	220 per year	1987-90
TOTAL:	3,210		
INACTIVE			
1860*	500	500 per year	UF_6
2335	275	—	
2336	250	250 per year	1985-94
2389	75	75 per year	1986-90
2705A	200	—	UF_6
2777	250	—	
2804	100	—	
2297	—	200 per year	1986-89
TOTAL:	1,750		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 2553, 2763, 2774.

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CURRENT MARKET DATA

URANIUM DEMAND
(October 31, 1985)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Inquiries to Purchase:			
ACTIVE			
2743	300	—	
2748*	75	75	
2762*	150	—	
2775	200	—	
2784	100	—	
2798*	70	—	
2217	—	1,000 per year	1989-95
2507	—	600	1987-89
2681	—	500 per year	UF_6 or U_3O_8; 1987-88
2741	—	600	
2733*	—	500 per year	1987-95
2753	—	200	1987
2758	—	500	UF_6
2760*	—	250	1986-90
2796	—	175 per year	1988-92
2808*	—	250	1989 on
TOTAL:	895		
INACTIVE			
2548	290	—	
2586	300	300 per year	1987-90
2767	200	—	UF_6
2786*	200	—	
2643	—	150 per year	1987 on
TOTAL:	990		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 2676, 2785.

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CURRENT MARKET DATA

LOAN SUPPLY AND DEMAND
(October 31, 1985)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Within 1 Year	Beyond 1 Year	Remarks
Available for Loan:			
ACTIVE			
2805*	2,000	—	
TOTAL:	2,000		
INACTIVE			
1938*	2,000	—	UF_6
2036	500	—	
2667	800	—	
TOTAL:	3,300		

*New or revised since last month.
[1]Measured from the date of this Report.
Projects removed since last month: 2483, 2806.

No inquiries to borrow are reported this month.

CONVERSION SUPPLY AND DEMAND
(October 31, 1985)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U as UF_6) Within 3 Years	Beyond 3 Years	Remarks
Available for Sale:			
INACTIVE			
2051	100	—	
TOTAL:	100		
Inquiries to Purchase:			
INACTIVE			
2623	1,000	—	
2724	—	375	1989-93
TOTAL:	1,000		

*New or revised since last month.
[1]Measured from the date of this Report.
Projects removed since last month: 2587, 2709.

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CURRENT MARKET DATA

SWU SUPPLY
(October 31, 1985)

Nuexco Project Number	Delivery Period[1] (Thousands of SWUs) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale:			
ACTIVE			
2410A	350	—	
2705	350	—	
2746*	100	—	
2571	—	55	1987
TOTAL:	800		
INACTIVE			
2652	—	25	1986
TOTAL:	0		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes SWUs deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 2359, 2378, 2510, 2607.

SWU DEMAND
(October 31, 1985)

Nuexco Project Number	Delivery Period[1] (Thousands of SWUs) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Inquiries to Purchase:			
ACTIVE			
2400	—	150	1987-90
2742	10	—	
2752	65	—	
2761*	115	—	
2797*	—	150	1988-89
TOTAL:	190		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes SWUs deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 2500, 2512, 2519, 2578, 2747.

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ANALYSIS & COMMENTARY

DENIAL OF FULL-COST RECOVERY: US UTILITIES' BIGGEST FRONT-END FUEL-CYCLE PROBLEM

Introduction

The rising incidence of regulatory authority denial of full-cost recovery for nuclear plant construction threatens the foundations of US utility financing. Industry attention has shifted away from licensing issues and toward the problems of investment return and cost recovery. Regulatory bodies and ratemaking authorities are requiring utilities to justify expenditures incurred in building a nuclear plant, not only in light of circumstances that existed at the time the expenditures were originally approved, but sometimes in the light of events that took place well after the fact. Not only are costs of canceled units at risk, but full-cost recovery is also being challenged for nuclear units that have entered commercial operation. At present, at least ten US utilities are threatened by prudence investigations for new nuclear units.

Nuclear plant construction projects are rarely completed under the original budget. A utility's financial condition often suffers as a consequence of having to raise substantially more capital than originally planned. The necessity for expensive external financing to complete plants facing delays and cost overruns has motivated many utilities to obtain short-term debt at high interest rates. As a result, without specific regulatory authority assistance in rates, utilities generally have reduced shareholders' earnings under these circumstances. The Public Utilities Commissions' (PUC) disallowance of cost recovery due to imprudency rulings may, for such utilities, preclude the appropriate and timely recovery through rates of the costs of service.

Utilities bringing new nuclear units into operation will almost certainly face cost-prudence investigations of some type as long as current circumstances prevail. Public utility commissions, the state governmental bodies that establish rates and settle cost allocation issues, are empowered to examine records and compel testimony covering all aspects of a plant's construction and management. They impose on the utility the burden of proof to establish that decisions were made and costs were incurred prudently at all stages of the project. PUCs typically justify cost disallowances based on determinations of inefficiency, negligence, imprudence, lack of sufficient records, inequitable sharing of risks between ratepayers and shareholders, etc. Some standards applicable to most states include the following:

1. Courts have held that regulatory commissions must balance investor and consumer interests.

2. The PUC has the duty to review and approve just and reasonable rates which the utility may charge its customers. Unjust or unreasonable charges are prohibited.

3. The utility usually bears the burden of proof to show that any rate increase is just and reasonable.

4. The PUC may consider all factors which have a bearing upon rates, with due regard to a reasonable return on rate base; in other words, a utility is entitled to a fair return on its prudent investment.

Unfortunately, there are few industry standards for management prudence in the construction of nuclear power plants. Because some projects have been relatively successful in controlling costs and others have experienced a multitude of problems and inefficiencies, computed average costs of construction are virtually meaningless as references for specific situations. In addition, it is not evident that average costs result directly from prudent management. The Missouri Public Service Commission, in examining Union Electric Company's Callaway plant, determined that "the complexity of a project does not address the question of management prudence."

The following are some recent examples of pending cases in which the disallowance of construction costs is at issue. Most of the cases have not been concluded or are undergoing lengthy appeals processes following cost disallowance. While this is not a comprehensive study, the situations described herein indicate the magnitude of the problem for electric utilities.

Major Disallowances

Shoreham—The New York State Public Service Commission (PSC) began a $4.3 million prudency investigation of Long Island Lighting Company's (LILCO) Shoreham plant in 1979. Two administrative law judges ruled in March 1985 that LILCO had lost effective control of the project's construction, and recommended that the PSC disallow $1.2 billion of the total cost as having been incurred imprudently. The PSC in June 1985 voted to disallow as imprudent $1.35 billion of the Shoreham unit's $4.5 billion cost, and not to allow LILCO to recover those funds from customers through rates. LILCO has not yet begun measures to appeal the decision, but is expected to challenge the ruling either through the PSC or state courts. At present, Shoreham is conducting low-power tests, and LILCO has submitted a request for costs to be phased into its rate base gradually over ten years.

Wolf Creek—Following eight weeks of hearings on the Wolf Creek unit, the Kansas Corporation Commis-

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sion (KCC) staff recommended that the Commission declare $447 million of the unit's construction costs imprudent. The staff recommended that the KCC prohibit the utilities involved, Kansas Gas & Electric Co., Kansas City Power & Light Co., and the Kansas Electric Power Cooperative, from collecting those costs through rates. KCC staff had retained a consulting firm to analyze the costs incurred at Wolf Creek, and the firm found that $447 million in costs could be attributed to "imprudent management actions or cost overruns attributable to causes which were controllable by owner management." Another firm retained by the Commission to review whether or not the project was worthwhile concluded that it was not economical to build a nuclear plant in Kansas, and that the plant will create excess capacity for all three utilities.

Later, the KCC staff proposed to allow only $21.5 million of a $90.5-million rate increase requested by Kansas City Power & Light, citing construction imprudence on the part of the utility. The staff also concluded that the decision to continue construction after 1981 was imprudent and recommended that the KCC deny the utility a return on $208 million in Wolf Creek expenditures that fell under Kansas jurisdiction.

Callaway—The Missouri Public Service Commission ruled that Union Electric Company did not adequately coordinate construction and engineering aspects at the Callaway site and denied part of a rate request. Union Electric had requested a $2.4 billion increase in rate base, on which rates to consumers were to be based, but the Commission denied $384 million (16 percent). The denial was based on the Commission's ruling that imprudent cost overruns had occurred, resulting from the allegedly erroneous perception that design work had progressed further at the start of construction than was actually the case. Union has appealed that ruling.

The Illinois Commerce Commission also disallowed $30.6 million of Callaway-related costs from inclusion in the Illinois jurisdictional rate base for Union Electric. That represented a 9.8-percent reduction from the amount requested by the utility in Illinois. The Illinois decision was not based on alleged imprudence or any one major factor, but incorporated elements of the Missouri decision.

Minor Disallowances

Seabrook—The Massachusetts Department of Public Utilities ruled that the Seabrook plant, owned by sixteen utilities led by Public Service of New Hampshire (35.6 percent), was "too risky" a project for ratepayers and has ordered the three Massachusetts utilities involved in the project to guarantee that shareholders will assume the risk of future investments in the plant. The utilities appealed the decision, but the Massachusetts State Supreme Court upheld the ruling. If Seabrook is completed, the utilities reportedly will be allowed to recover the plant costs as long as ratepayers do not pay more for nuclear-generated electricity than that from other sources.

Because the utilities with ownership in Seabrook are spread among five different states, jurisdictional problems complicate the Seabrook cost-recovery issue. Central Maine Power requested a $60-million rate increase, but the Maine Public Utility Commission allowed only $36 million in rate base, and stipulated that Maine ratepayers will pay no more for Seabrook power than that from other sources.

In addition to disallowance of costs representing plants in service, certain other costs have been disallowed by various regulatory bodies. Under current regulatory practice, the carrying costs incurred during utility construction generally are capitalized for later recovery from ratepayers during a plant's operating life. The practice is known as the allowance for funds used during construction (AFUDC) method. An alternate method for recovery is to include the cost of construction work in progress (CWIP) in the current rate base, thereby passing on to the ratepayers the PUC-allowed rate of return on such additional rate base (assuming all such capital costs are allowed in rate base).

Waterford—The Louisiana Public Service Commission rejected a rate base increase request for costs associated with Louisiana Power & Light Co.'s Waterford Unit 3. The request included $487 million for CWIP, and was rejected because the plant was not yet in commercial operation.

Perry—The Cleveland Electric Illuminating Company (CEI) asked to collect $40 million in CWIP funds through rates for its Perry Unit 1, but the Ohio PUC refused, citing construction delays, cost overruns, and skepticism that the plant will be in service within a year. CEI requested a $180-million rate increase, but was allowed to collect only $19.5 million. The PUC also denied CWIP funds for Perry to both Toledo Edison Co. and Ohio Edison Co., other owners of the plant. However, a motion calling for a rehearing regarding CWIP funds has been granted.

South Texas Project—The Texas PUC awarded Houston Lighting and Power a $168-million rate increase after it had requested $554 million for its South Texas Project Unit 1. The PUC excluded from the rate base all construction costs, as well as 12.4-percent interest on the

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$617-million CWIP costs the utility requested, because the utility failed to carry its burden of proof that the two-unit project had been managed prudently and efficiently. The utility has entered appeals in the courts. The PUC did include a CWIP allowance on $947 million, 47 percent of the utility's other construction progress, and granted a 16.3-percent rate of return on common equity (the utility had requested a 17-percent return). The PUC will hear arguments on the economic viability of STP Unit 2, and the findings could serve as a future determination of prudence. In January 1985 the PUC had excluded all STP-2 CWIP from the current rate base.

Susquehanna—The Pennsylvania PUC ruled that Pennsylvania Power & Light cannot earn a return on equity for its Susquehanna Unit 2. However, costs associated with depreciation, operation, and maintenance can be charged to ratepayers immediately. The PUC also stated that since 945 MWe of the 1,050-MWe reactor is excess capacity, ratepayers should not be charged for its construction. The utility has appealed the decision, but does not expect a resolution for at least a year.

Court Overrules PUC

Bailly—An Indiana appeals court ruling barred Northern Indiana Public Service Co. (Nipsco) from recovering costs associated with its abandoned Bailly plant after the Indiana Public Service Commission had approved it. The court set aside the PSC order allowing the utility to recoup a $190.7-million investment in the plant. Nipsco is expected to appeal to the Indiana Supreme Court. This ruling could affect Public Service of Indiana's attempt to recover its $2.34-billion investment in the canceled Marble Hill plant. PSI will seek amortization of Marble Hill costs despite the Nipsco decision.

No Disallowance

Two examples of units nearing operation which have been allowed full-cost recovery are Arizona Public Service's Palo Verde Unit 1 and Georgia Power Co.'s Vogtle. The California and Texas PUCs already have approved their shares of the Palo Verde plant and have allowed the costs to be borne by the ratepayers in their jurisdiction. The Georgia Senate passed a bill requiring the PSC to phase in over three to six years the estimated $7.2-billion cost of Vogtle. The House must also approve the bill.

Fuel-Related Prudency Issues

Public utility commissions increasingly are examining management prudency in areas other than construction costs. That increased scrutiny now extends to utilities' uranium costs and investments. This includes capitalization expenditures and investment returns for uranium exploration, development, joint venture projects, and supply contracts. Several recent rulings demonstrate that full-cost recovery of expenditures related to fuel procurement is not automatic.

The New York Public Service Commission (PSC) ruled in March 1984 that Niagara Mohawk Power Corporation could not recover from ratepayers the full cost of uranium it acquired through a joint-venture development project with a US producer. More recently, the commission refused to allow Long Island Lighting Company (LILCO) to charge ratepayers $11.3 million spent to maintain the Bokum Resources Corporation's uranium mine and mill in New Mexico. LILCO has invested $115 million in the joint-venture project, no part of which has yet been approved by the Commission for recovery through rates.

The California Public Utilities Commission is investigating the uranium purchasing practices of California utilities. Pacific Gas & Electric Company, Southern California Edison Company, and San Diego Electric & Gas Company were required by September 1, 1985 to respond to a questionnaire regarding spot uranium purchases and plans for future uranium contracts. The questionnaire also asked for the price of uranium offered and sold in available markets for the past five years, uranium price forecasts for the next ten years, and a summary of current contractual obligations between the utilities and their suppliers. The PUC will study the responses and a hearing is expected in January 1986 to determine a method for uranium cost recovery that can be applied in all cases.

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UPDATE

A CHRONOLOGY OF THE UTILITY SERVICES ENRICHMENT CONTRACT

The status of the Utility Services enrichment contract (USEC) is uncertain due to its recent invalidation by a federal court. The following chronology traces its evolution, beginning with its first publication in draft form. Significant enrichment market developments also are included.

August 1982

On August 21, 1982, the Fixed-Commitment Contract (FC) price, which previously had been $130.75 per SWU, was changed to $138.65 per SWU. The Requirements Contract price, which had been $144.15 per SWU, was changed to $149.85 per SWU. Secondary market SWUs for 1983 delivery became attractive to DOE 3.5-Year-Requirements Contract holders at $112 per SWU, minus a variable discount necessary to motivate buyers to act. The discounts ranged from $3 to $5 for DOE's Adjustable Fixed-Commitment (AFC) SWUs and $8 to $11 for Eurodif SWUs.

During the month of August, DOE issued the draft of the Facility Requirements (FR) Contract. The draft offered DOE customers greater flexibility. It included a three-year, rolling-commitment period, the low AFC SWU price, and high termination charges. However, the FR contract draft differed from the AFC contract in four important respects:

1. The FR contract had a shorter committed rolling period;
2. It included larger financial penalties for contract termination, such as full payments based on the estimated number of SWUs for a period of up to ten years in the worst case;
3. Requirements could be reduced through substitution of material originally enriched by DOE (as in the AFC contract) upon advance notice 30 months prior to the beginning of the year of delivery;
4. It allowed reduced advance payments.

DOE announced January 1983 as the final issue date for the contract.

January 1983

DOE announced that the FR contract would not be issued until July 1983.

June 1983

DOE entered private contract negotiations with two US utilities. The talks were canceled by DOE upper management because of legal and policy concerns.

July 1983

John R. Longenecker succeeded W. R. Voigt as Deputy Assistant Secretary for Uranium Enrichment and Assessment. DOE announced that the FR Contract would be issued in October 1983, not July. The draft had been reworked "extensively" and had a new name—the Utility Services Contract.

Over the past few years, it had become possible for holders of 3.5-year Requirements contracts to achieve substantial savings by participating in the developing secondary SWU market. The mechanism used was the partial termination of the Requirements contract. Even after paying the DOE termination charges (10 to 25 percent of the contract price per SWU), these buyers could purchase secondary market SWUs to replace their terminated DOE deliveries and still save enough money to justify the effort. So on July 25, DOE offered the Interim Sales Contract (ISC) to all 3.5-Year-Requirements Contract holders. The ISC essentially was a short-term, fixed-commitment contract modified to reflect a special 60-day payment term and 180-day notice on quantities and assays of feed and enriched product. It offered a price reduction of approximately $11.20 per SWU to any 3.5-Year-Requirements Contract holder willing to waive the right to terminate and agree to take all FY83 through FY85 SWU requirements from DOE. The price reduction was achieved by offering the fixed-commitment price ($138.65) instead of the Requirements price ($149.85). It also increased the payment term from 30 days to 60 days (except for deliveries that took place between August 1983 and September 1983).

In direct response to the ISC, secondary market SWU prices declined $11. The net commercial effect of the ISC was to make secondary market SWUs for 1984 delivery attractive to 3.5-Year-Requirements Contract holders at $101 per SWU, minus a variable discount of $3 to $5 for AFC SWUs and $9 to $12 for Eurodif SWUs. The ISC also put DOE in direct competition with their own customers, sellers of excess AFC SWUs.

October 1983

In addition to the ISC, DOE offered the Modified Interim Sales Contract (MISC) to all 3.5-Year-Requirements Contract holders. This contract was identical to the ISC except for the following provisions:

1. The holder could substitute 40 percent of 1984 reactor requirements and 60 percent of 1985 requirements at no charge, provided the substitute SWUs or

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enriched uranium were of DOE origin and were not sold by a seller in order to buy non-DOE SWUs.

2. The holder agreed to convert to the Utility Services contract when it was issued.

AFC SWU prices on the secondary market rose to about $115 per SWU, but the DOE decision to offer the MISC further reduced the competitive price for non-DOE SWUs because it allowed DOE customers to partially substitute DOE SWUs without termination charges. Partial termination to buy non-DOE SWUs required the full payment of termination charges. Thus, because of the termination charges, non-DOE SWU prices declined to between $80 and $85 per SWU to remain attractive.

November 1983

DOE announced that the Utility Services contract would be issued soon. A meeting between DOE and the utilities' representatives was scheduled for December 20.

December 1983

Prior to the DOE meeting with utilities, there were rumors that a seller was offering AFC SWUs at $105 per SWU. This made the competitive non-DOE SWU price for 1984 delivery approximately $87 per SWU, minus the necessary additional incentive needed to motivate a buyer.

On December 20, 1983, US Energy Secretary Donald Hodel made a one-hour presentation to utility executives. He referred to the new contract as the "Requirements Contract." Although no details were given, the package was reported to include the following terms:

1. It would consist of one contract per utility as opposed to one per plant;
2. A percentage of requirements could be specified;
3. A variable tails assay option could be available at a cost;
4. There would be some sort of price protection;
5. The contract would contain termination provisions with higher charges for greater flexibility;
6. It would allow partial substitution for DOE SWUs at no charge.

Following the meeting, the utilities' chief concerns were the price mechanism, the terms of conversion to the new contract, and a schedule for a final contract offer. The DOE schedule was said to provide for a draft contract before year-end, a submission to Congress in mid-January, and a final issue date in February.

DOE sent the new Draft Utility Services Contract to its customers on December 30. The contract was essentially a requirements-type contract. The standard terms and conditions were much the same as those reported to utility executives by Secretary Donald Hodel on December 20. Some specifics included the following:

1. Current contract holders had to convert to the new contract by October 1984 in order to receive the terms and conditions contained therein.
2. AFC customers had to sign up for 100 percent of their requirements prior to 1987. After 1987, AFC customers could agree to take 70 to 100 percent of requirements. From the beginning, Requirements contract holders could sign up for 70 to 100 percent.
3. The ceiling price initially was set at $135 per SWU. DOE could adjust the basis for the ceiling on three years' advance notice.
4. Termination charges were prohibitively expensive.
5. The customer could change its percentage commitment plus or minus 10 percent with 10 years' advance notice.
6. Amounts and assays of enriched material were to be confirmed 180 days in advance of delivery.

It later became apparent that the process of acquiring Utility Services contract customers was being handled by DOE negotiators strictly on a case-by-case basis. Virtually all of the contracts were non-standard.

January 1984

DOE released a final draft USEC incorporating several important changes.

1. Customers had to *agree* to convert to the new USEC by October 1, 1984.
2. AFC contract holders could reduce their FY85 and FY86 SWU purchases by 10 and 25 percent, respectively.
3. Requirements contract holders could convert and *immediately* begin taking only 70 percent of requirements from DOE.
4. The lead time for changing the commitment percentage was reduced to five years.
5. Termination charges were reduced to zero upon 10 years' advance notice.
6. Requirements above the minimum commitment could be purchased from any source beginning in FY87.

February 1984

On February 6, Duke Power Company became the first utility to sign the new USEC. Duke was able to obtain extra relief from its old AFC contracts in that DOE agreed to allow Duke to substitute inventory consumption for SWU purchases at a rate greater than 30 percent of requirements in FY87.

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UPDATE

DOE held a meeting in Oak Ridge, Tennessee to discuss operational plans, research and development, and the new USEC. Meanwhile, non-DOE primary enrichers began offering especially attractive contract terms in an effort to dissuade DOE customers from signing the USEC.

April 1984

On April 4, DOE announced FY85 prices of $153 per SWU for fixed-commitment customers and $157 per SWU for requirements customers. Industry sources speculated that the large price increases were part of an effort by DOE to force customers toward the USEC, which had a contract price of $135 per SWU.

August 1984

As one US utility signed a ten-year Eurodif enrichment contract, DOE publicized its consideration of filing anti-dumping charges to protect its market.

October 1984

Because more utilities converted to the USEC than anticipated, DOE began leaking information that the FY86 USEC price could fall to $125 per SWU, an action that served to depress secondary market SWU prices even further.

Unexpected support for the new contract materialized as DOE conducted case-by-case negotiations, as evidenced by the fact that only *two* customers converted to the standard USEC contract. All others negotiated special terms before converting. Table 1 summarizes the conversions.

Table 1

CONVERSION TO THE USEC
(By utility)

	Number of Customers	
	Converted	**Did Not Convert**
US Customers	45	5
Non-US Customers	27	10

It was reported that Cogema reached an agreement with the Eurodif shareholders to market their excess SWU commitments in order to bring order to the chaotic market in which the shareholders were competing with one another.

December 1984

Three US uranium producers filed suit against DOE in the US District Court in Denver. The main contentions were the illegality of the USEC contract and the failure of DOE to protect the domestic uranium industry as required by the Atomic Energy Act of 1954, as amended.

On December 27, the General Accounting Office (GAO) reported several irregularities in the USEC which may have violated the law, including:

1. The issuance of the new contract did not comply with the Administrative Procedures Act.
2. The price ceiling in the USEC was not authorized by the enrichment criteria.
3. Certain accounting procedures used to write down plant assets were misapplied.

January 1985

After months of negotiation, the Tennessee Valley Authority (TVA) and DOE reached an agreement whereby TVA would supply some cheaper off-peak power to DOE which, over a 10-year period, would reduce the DOE SWU price by about $0.37 per SWU.

February 1985

John Herrington replaced Donald Hodel as US Secretary of Energy.

April 1985

Martin Marrietta replaced Union Carbide as operator of DOE's Oak Ridge facilities and began to provide support to DOE's SWU marketing efforts.

DOE formally proposed an incentive pricing program to its enrichment customers. This program marked DOE's first attempt to compete directly with non-DOE SWU suppliers for that portion of its customers' requirements in excess of 70 percent under the USEC. Incentive SWUs were priced at $90 for FY87 and FY88, and $90 escalated for FY89 and FY90.

May 1985

In a declaration to the US District Court in Denver (as part of DOE's answer to the uranium producers' lawsuit), a DOE representative discussed the individual USEC conversion negotiations and stated that all but two of the converted contracts contained provisions materially different from the draft contract.

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June 1985

A trade association called the Uranium Producers of America (UPA) was formed. The new association's main goals were the enactment of effective mill tailings legislation and the recognition by the government of an obligation to ensure that a major share of US uranium requirements will be supplied by domestic production. (UPA later filed a supporting brief on behalf of the plaintiffs in the lawsuit against DOE.)

The results of DOE's Process Evaluation Board were released. The findings included the following:

1. The Atomic Vapor Laser Isotope Separation (AVLIS) process was to be DOE's choice for future enrichment capacity.
2. The Oak Ridge Gaseous Diffusion Plant was to be placed on indefinite standby.
3. The Portsmouth Gas Centrifuge Enrichment Plant (GCEP) project was to be abandoned.

September 1985

US District Court Judge Carrigan, ruling on opposing motions for summary judgment, declared the USEC null and void because the contract amounted to a change in the enrichment services criteria. Little market response was noted while utilities evaluated the effects of the decision. At least one utility temporarily withheld payment for future enrichment services.

DOE announced a FY86 SWU price under the USEC of $125 per SWU, and also announced a new, high-assay SWU price of $492 per SWU for enrichment over 10 weight-percent. The high-assay SWU price reflects the additional cost of operating the smallest two of DOE's five diffusion machine sizes. The weighted average price for high enriched uranium would vary between $125 and $134 for those utility customers with USEC contracts (which have a FY86 ceiling price of $134 per SWU). The SWU prices under Requirements or Fixed-Commitment contracts did not change.

October 1985

Assistant Secretary Longenecker warned that utilities should beware of seeking other sources of SWU supply in the wake of the court ruling of the USEC's invalidation. He said such utilities might later find themselves with two competing contracts.

The condition of the SWU markets at the end of October essentially was static as participants assessed the implications of the court ruling invalidating the USEC. Despite the ruling, many DOE customers have proceeded on the assumption that any one of the following possibilities will keep the USEC in effect:

1. A reversal of the Denver court ruling;
2. The inclusion of new procedural steps to overcome the identified problem areas in the contract; or
3. New legislation that would legitimize the contract.

While non-DOE primary SWU sellers have been cautious to avoid overt attempts to lure DOE customers away from DOE, the secondary market remains inactive because of buyers' unwillingness to make commitments until the prevailing uncertainties are resolved.

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RECENT DEVELOPMENTS

AUSTRALIA

The Olympic Dam (Roxby Downs) joint venture partners, Western Mining Co. and BP Australia Ltd., have appointed Kanematsu Gosho as sole agents for marketing Roxby Downs uranium in Japan. Uranium production at Roxby Downs is scheduled to begin in mid-1988. Kanematsu Gosho, though not one of the largest trading companies in Japan, has had a long-standing relationship with Western Mining Co. in conjunction with iron ore sales to steel mills in Japan. Previously, the trading company was the Japanese agent for sales from Yeellirie before that project was indefinitely deferred in 1984.

* * *

Energy Resources of Australia's (ERA) Ranger mine produced approximately 560 metric tons U_3O_8 (1,235,000 pounds U_3O_8) in the third quarter 1985, a 25-percent decline from the previous quarter. The drop was attributed to extended plant maintenance, the result of pushing the plant to maximum capacity performance levels in the second quarter. Despite the decline, ERA expects total production in 1985 to approach the plant's design capacity of 3,000 metric tons U_3O_8 (approximately 6,600,000 pounds U_3O_8) per year. Preparations for a 50-percent expansion have already begun. By 1988, annual U_3O_8 output will be 4,500 metric tons, approximately 10,000,000 pounds.

FEDERAL REPUBLIC OF GERMANY

Preussische Elektrizitaetswerk AG (PREAG) and Nordwestdeutsche Kraftwerk AG (NWK) merged on September 23, 1985, becoming the nation's second-largest utility. Rheinisch-Westfaelisches Elektrizitaetswerk AG (RWE) remains West Germany's largest producer of electricity. PREAG owned 69.9 percent of NWK prior to the merger. On November 19, the new utility officially will assume the name Preussenelektra AG, with headquarters in Hannover, Lower Saxony. The staff of NWK will relocate from Hamburg to Hannover by the spring of 1987.

The combined utility owns two nuclear power units outright and owns shares in five other units (Table 2). In addition, Preussenelektra manages the fuel supply for five of the units. Because the utility is a wholesaler of electric power, its customer base includes most of the regional electricity distribution companies in the northern and eastern parts of the FRG. It also serves several major industrial companies, including the automobile manufacturer Volkswagen AG. Figure 1 illustrates the service areas of the principal West German utilities. (See page 15 of Report 202, June 1985, for an article describing the nuclear fuel market infrastructure in the FRG.)

Table 2

PREUSSENELEKTRA'S OWNERSHIP IN NUCLEAR POWER UNITS

Unit	Other Owner	MWe (net)	Type	COD[1]	Preussenelektra Percent Ownership	Preussenelektra Share of Capacity (MWe net)
Wuergassen	—	640	BWR	Mar 1972	100	640
Unterweser	—	1,230	PWR	Oct 1979	100	1,230
Brokdorf[2]	HEW[3](20%)	1,290	PWR	Jun 1987	80	1,032
Stade	HEW (33%)	630	PWR	May 1972	67	422
Grohnde	GKW[4](50%)	1,290	PWR	Feb 1985	50	645
Kruemmel[5]	HEW (50%)	1,260	BWR	Mar 1984	50	630
Brunsbuettel[5]	HEW (67%)	771	BWR	Feb 1977	33	254
Total MWe Nuclear						4,853

[1]COD = Commercial Operation Date.
[2]The Brokdorf unit is under construction.
[3]HEW = Hamburgische Elektricitaetswerke AG.
[4]GKW = Gemeinschaftskraftwerk Weser.
[5]HEW manages the fuel supply for the Kruemmel and Brunsbuettel units.

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Figure 1

SERVICE TERRITORIES OF PRINCIPAL WEST GERMAN UTILITIES
(Shading indicates Preussenelektra service territory)

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RECENT DEVELOPMENTS

JAPAN

The US Department of Energy (DOE) has approached the Japanese Ministry of Trade and Industry (MITI) to solicit cooperation in the form of financial assistance for DOE's development program for laser enrichment. MITI agreed to establish a committee that includes Japanese utility participation to review DOE's request. It is expected that some degree of cooperation from Japan may result, although probably not on the scale suggested by DOE. MITI officials are considering the following factors:

1. The committee will examine the nature of any commercial benefits for the Japanese utilities if the private sector were to participate along with the government in providing financial assistance. While some have noted that utility participation could help to correct the current Japan-USA trade imbalance, the utilities are not motivated by that argument because they do not see themselves as contributors to the trade imbalance. In fact, Japanese utilities are chiefly importers, primarily of fossil fuels (though not necessarily from the USA).

2. Japanese utilities already have committed to participate in a private venture for construction of a domestic enrichment facility capable of supplying one-third of their enrichment needs by the turn of this century. This participation involves significant financial contributions.

3. The Japanese government and utilities are supporting their own laser enrichment development programs.

* * *

The Power Reactor and Nuclear Fuel Development Corporation (PNC), the government-affiliated organization in charge of several national programs for nuclear power, recently announced progress on some of its projects. PNC held ground-breaking ceremonies for the long-delayed Monju 280-MWe fast-breeder reactor. Initially scheduled for 1985 operation, PNC now plans to complete the project in 1992. Construction cost is estimated at 600 billion yen (approximately US$2.8 billion).

PNC also obtained final licensing review for a 200,000 SWU-per-year enrichment facility to be built in the Okayama prefecture. The plant will demonstrate on a commercial scale the centrifuge enrichment technology developed by PNC, and will serve as a prototype for a larger plant planned by the Japanese utilities in the Shimo-kita region in the northern part of Honshu (Nuexco Report 205). Construction of the prototype plant will begin in November 1985; the facility is scheduled to reach a 100,000 SWU capacity in 1987 and full capacity in 1988. Total cost of the prototype facility is estimated at 67 billion yen (approximately US$312 million).

* * *

Total nuclear generation capacity of the Japanese utilities increased to 23,631 MWe when Tokyo Electric Power Company's (TEPCO) Kashiwazaki Unit 1 (1,100-MWe BWR) began commercial operation. The unit, TEPCO's tenth nuclear unit (all BWRs), increased TEPCO's total nuclear generating capacity to 9,096 MWe, making it the world's largest private utility nuclear power program. TEPCO released several announcements regarding its program:

1. It has received licensing approvals for the use of higher efficiency BWR fuel designs. The new design, featuring a thin zirconium liner on the inside wall of the fuel rod tube, was developed in cooperation with BWR manufacturers Toshiba and Hitachi, and other BWR utilities (Chubu EPC, Chugoku EPC, and Tohoku EPC). TEPCO plans to phase the new fuel design into its reactors beginning in 1987.

2. TEPCO has reevaluated its policies related to fuel in-core management. Typical of Japanese utility practice, to date TEPCO has subcontracted this function to the reactor vendor, and the initial nuclear system supplier has provided reload fuel. TEPCO potentially could undertake core management in order to permit greater flexibility and competition in fuel supply.

* * *

Releasing results for the first half of fiscal year 1985 (April to September), the Japanese utilities announced near-record availability factors for their 30 operating nuclear power units. The combined availability was 72.8 percent, the third highest figure obtained to date for a similar six-month period. Of the 30 units, 29 are light-water reactors (15 BWRs and 14 PWRs), and one is a gas-cooled reactor. Shikoku EPC's Ikata Unit 2, a 566-MWe PWR, recently established a new Japanese performance record by operating for 416 consecutive days prior to a scheduled shutdown. The period exceeded the previous record, held by Kyushu EPC's Genkai Unit 2 (a 559-MWe PWR), by two days.

* * *

The government Agency of Natural Resources and Energy (ANRE) announced 1985 power generation costs for various types of electricity generation facilities. Costs were calculated for plants starting operation in 1985, and included costs for both the initial operation year and for lifetime operation, assuming 3-percent annual inflation. The results are tabulated in Table 3. Calculations do not include transmission and distribution-related facilities. Nuclear estimates do not include costs for future decommissioning or waste disposal. ANRE concluded that

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nuclear power continues to be competitive with other sources in both the near-term and the long-term. Table 3 also shows 1985 plant construction costs per kilowatt of installed capacity. Except for some escalation in LNG (liquid natural gas) facility construction costs, the results are essentially unchanged from a similar 1984 evaluation.

SOUTH AFRICA

Third-quarter uranium production from members of the Chamber of Mines amounted to 3,154,000 pounds U_3O_8, a 12-percent increase over the previous quarter (Table 4). The higher output can be attributed to the following:

1. A 42-percent increase in production at Vaal Reefs, at which total tons treated increased 29 percent and yield rose 15 percent.
2. Greater tonnage treated at Randfontein led to a 14-percent rise in production.
3. Chemwes (Stilfontein), Driefontein Consolidated, ERGO (East Rand Gold and Uranium Co.), and Hartebeestfontein all recorded higher outputs than in previous quarters in 1985.

Western Deep Levels ceased production during the second quarter of 1985, so there was no output in the third quarter, but sales from its stockpile continued to generate income. The cessation of production will reduce South Africa's annual output by approximately 400,000 pounds U_3O_8.

Because of labor unrest at the South Lease area of Vaal Reefs, second-quarter Vaal Reefs production was lower than usual. South Lease output doubled in the third quarter, returning Vaal Reefs to normal production levels. The short-lived strike by the National Union of Mineworkers (NUM) affected only two uranium mines, namely Hartebeestfontein and Driefontein. However, third-quarter uranium output increased at both mines, indicating that the strike, because of its short duration, had no demonstrable effect on uranium production.

Table 3

1985 ELECTRICAL GENERATING COSTS IN JAPAN[1]

	Net Generation Cost—Initial Year		Lifetime Generation Cost[2]		Current Construction Cost	
Source	yen/kwh	(¢/kwh)	yen/kwh	(¢/kwh)	yen/kw	($/kw)
Nuclear	13	(6.0)	12	(5.6)	310,000	(1,442)
Hydro	21	(9.8)	13	(6.0)	630,000	(2,930)
Oil	17	(8.0)	19	(8.8)	140,000	(651)
Coal	14	(6.5)	13	(6.0)	240,000	(1,116)
LNG[3]	17	(7.9)	19	(8.8)	210,000	(977)

[1]Costs converted from Japanese yen to US dollar at a rate of 215 yen per dollar.
[2]Assumes a three-percent inflation rate.
[3]LNG = Liquid Natural Gas.

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RECENT DEVELOPMENTS

Table 4

REPUBLIC OF SOUTH AFRICA: 1985 URANIUM PRODUCTION[1]
(Thousands of pounds U_3O_8)

Operation	First Quarter 1985	Second Quarter 1985	Third Quarter 1985	Year to Date
Beisa (St. Helena)	0	0	0	0
Blyvooruitzicht	0	0	0	0
Buffelsfontein	401	378	366	1,145
Chemwes (Stilfontein)	148	148	160	456
Driefontein Consolidated	45	47	51	143
ERGO[2]	83	76	92	251
Harmony	256	225	225	706
Hartebeestfontein	239	222	243	704
JMS[3]	314	356	348	1,018
Randfontein	291	319	363	973
Vaal Reefs	1,156	799	1,137	3,092
Western Areas	150	189	171	510
Western Deep Levels	62	57	0	119
TOTAL[4]	3,145	2,816	3,154	9,115

[1]Excludes Palabora Mining Company, which is not a member of the Chamber of Mines.
[2]ERGO = East Rand Gold and Uranium Co. Ltd.
[3]JMS = Free State Joint Metallurgical Scheme.
[4]Columns may not add due to rounding.

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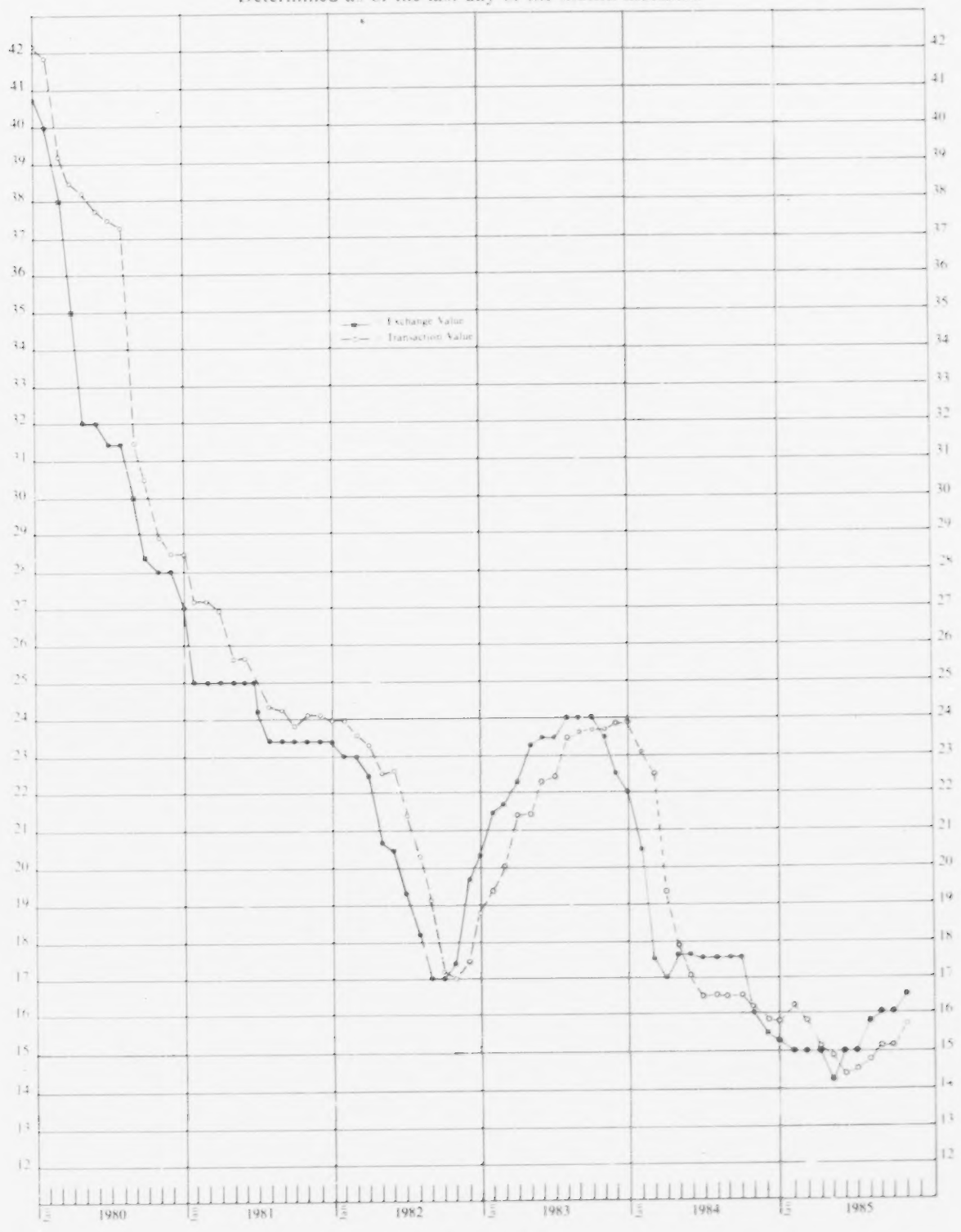
HISTORICAL MARKET DATA

EXCHANGE AND TRANSACTION VALUES SINCE JANUARY 1980

Determined as of the last day of the month indicated



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HISTORICAL MARKET DATA

HISTORICAL EXCHANGE VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	32.50	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	19.75	20.25
1983	21.50	21.75	22.25	23.25	23.50	23.50	24.00	24.00	24.00	23.50	22.50	22.00
1984	20.50	17.50	17.00	17.75	17.75	17.50	17.50	17.50	17.50	16.00	15.50	15.25
1985	15.00	15.00	15.00	14.25	15.00	15.00	15.75	16.00	16.00	**16.50**		

HISTORICAL TRANSACTION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.60	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	17.55	18.80
1983	19.35	20.00	21.35	21.40	22.35	22.45	23.50	23.60	23.65	23.65	23.85	23.85
1984	23.05	22.50	19.25	17.90	17.00	16.50	16.60	16.40	16.55	16.05	15.90	15.90
1985	16.20	15.70	15.05	14.90	14.45	14.60	14.75	15.10	15.10	**15.75**		

HISTORICAL CONVERSION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U as UF_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1981	1.20	1.20	1.20	1.40	1.15	1.15	1.15	1.10	1.10	1.10	1.20	1.20
1982	1.20	1.20	1.20	1.20	1.00	1.00	1.00	0.90	1.10	1.60	1.45	1.45
1983	1.20	1.40	1.40	1.20	1.20	1.20	1.10	1.10	1.00	0.60	0.60	0.60
1984	0.60	0.30	0.80	0.80	0.80	0.00	0.00	0.80	1.00	1.00	0.80	0.80
1985	1.00	1.00	1.00	1.50	1.50	1.60	1.60	1.60	1.60	**1.60**		

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AUSTRALIA

GOVERNMENT STATISTICS

	Price Index of Materials Used in Manufacturing Industry—All Groups[1] (1969=100)	Award Rates of Pay Indexes Australia—Adult Males In Mining Wage and Salary Earners, Weekly Rates[2] (1976=100)
1983 Avg.	401.2	181.8
Jun 1984	404.7	197.4
Jul 1984	408.3	197.4
Aug 1984	413.1	197.4
Sep 1984	411.9	197.4
Oct 1984	408.4	197.4
Nov 1984	407.1	197.4
Dec 1984	406.0R	197.4
Jan 1985	409.4R	197.4
Feb 1985	416.0	197.4
Mar 1985	429.5R	197.4
Apr 1985	440.4R	202.3
May 1985	452.0R	202.3
Jun 1985	456.3	202.4
Jul 1985	455.5	202.3
Aug 1985	—	202.4

P = Preliminary R = Revised since last month

CANADA

		Wage-earner Data: Average Hourly Earnings (C$)[2]					
	Industry Selling Price Index: Manufacturing[1] (1971=100)	Uranium Mines (SIC 057)	Metal Mines* (SIC 051-059)	Mines, Quarries and Oil Wells[3] (SIC 051-099)	Primary Metal Industries Non-ferrous[4] (SIC 296)	Primary Metal Industries Non-ferrous[4] (SIC 298)	Chemicals and Chemical Products[5] (SIC 372-379)
1983 Avg.	298.8	—	—	14.30	—	—	11.17
Aug 1984	312.7	17.24	15.36	14.92	12.44	10.34	11.78
Sep 1984	312.3	17.68	15.96	15.34	12.51	10.52	11.90
Oct 1984	312.3	17.64	16.15	15.26	12.69	10.56	11.96
Nov 1984	313.6	18.04	16.13	15.43	12.47	10.51	11.96
Dec 1984	314.2	17.95	16.39	15.60	12.16	10.40	11.99
Jan 1985	315.8R	18.05	16.13	15.60	12.32	10.80	12.04
Feb 1985	316.5	18.78	16.41	15.68	12.52	11.05	12.06
Mar 1985	318.0	18.24	16.21	15.57	12.43	10.97	12.02
Apr 1985	318.2	18.63	16.44	15.80	12.81	11.23	12.04
May 1985	318.8	19.41	16.51	15.63	12.76	11.25	12.15
Jun 1985	319.0R	18.49	16.20	15.49	12.89	11.14	12.14
Jul 1985	319.2R	18.14	16.27R	15.41R	12.96R	11.17R	12.14R
Aug 1985	319.0R	17.56P	16.15P	15.39P	12.96P	11.17P	12.23P
Sep 1985	319.5	—	—	—	—	—	—

P = Preliminary R = Revised since last month

For annual averages prior to 1983, and for notes pertaining to these statistics, see pages 23-26 of Report 190 of June 1984.

* The 1980 average for Metal Mines was incorrectly reported as 10.59. The correct average is 10.58 (see Report 190).

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REPUBLIC OF SOUTH AFRICA

GOVERNMENT STATISTICS

	Average Declared Working Costs per per Metric Ton of Gold Ore Milled (Rand)[1]	Tonnage-Weighted Index of Average Working Costs per Metric Ton of Gold Ore Milled (March 1982=100)[2]	Consumer Price Index[3] (1975=100)[4]	Producer Price Index All Groups[5] (1975=100)	Total Employment in Mining and Quarrying (Code 35)[6]	Total Salaries and Wages in Mining and Quarrying (1,000 Rand) (Code 40)[6]
1983 Avg.	51.87	115.0	262.2	274.8	696,579	3,644,772
Aug 1984	—	—	297.0	300.8	721,905	361,357
Sep 1984	60.64	133.2	299.9	304.1	721,470	359,218
Oct 1984	—	—	303.7	308.7	717,865	363,755
Nov 1984	—	—	307.4	312.8	717,396	369,771
Dec 1984	62.92	138.6	309.4	315.9	701,198	365,234
Jan 1985	—	—	177.1*	166.6*	711,366	376,777
Feb 1985	—	—	182.8*	171.3*	727,932	361,823
Mar 1985	64.48	142.4	183.6*	173.0*	708,809	371,380
Apr 1985	—	—	187.4*	174.0*	724,187	369,005
May 1985	—	—	189.5*	177.7*	708,085	373,478
Jun 1985	67.42	148.9	191.9*	179.2*	724,587	395,543
Jul 1985	—	—	193.6*	180.7*	738,228	419,106
Aug 1985	—	—	195.6*	183.2*	—	—
Sep 1985	—	—	197.8*	—	—	—

*The basis for calculation for these indices has been revised to January 1980 = 100.

UNITED STATES

	Producer Price Index[1]		Consumer Price Index[2]	GNP Implicit Price Deflator[3]	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[4]			
	Industrial Commodities (1967=100)	All Commodities (1967=100)	(1967=100)	(1972=100)	Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
1983 Avg.	315.8	303.1	298.4	215.63	12.57	13.43	10.59	8.65
Aug 1984	323.5	310.9	313.0	—	13.10	13.51	11.13	9.00
Sep 1984	322.3	309.5	314.5	224.57	13.20	13.39	11.23	9.08
Oct 1984	323.2	309.4	315.3	—	13.23	13.53	11.32	9.09
Nov 1984	323.8	310.4	315.3	—	13.23	13.76	11.35	9.15
Dec 1984	323.0	309.9	315.5	226.10	13.28	13.66	11.37	9.27
Jan 1985	322.9	309.5	316.1	—	13.29	13.70	11.39	9.33
Feb 1985	322.5	309.2	317.4	—	13.30	13.73	11.39	9.33
Mar 1985	322.6	308.7	318.8	229.07	13.29	13.95	11.37	9.39
Apr 1985	323.8	309.3	320.1	—	13.43	13.62	11.48	9.40
May 1985	325.3	309.9	321.3	—	13.24	13.59	11.46	9.39
Jun 1985	324.7	309.1	322.3	230.53R	13.23	13.66	11.52	9.46
Jul 1985	324.3	309.0	322.8	—	13.45	13.82	11.60	9.47
Aug 1985	323.6	307.2	323.5	—	13.45	13.70	11.63	9.52
Sep 1985	322.5	305.8	324.5	232.44	13.45P	13.66P	11.69P	9.59P

P = Preliminary R = Revised since last month

For annual averages prior to 1983, and for notes pertaining to these statistics, see pages 23-26 of Report 190 of June 1984.

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